DRAFT
The Message 1.1

It has been said in aviation circles: "If I'm going to be in on the crash, I'd like to be in on the takeoff". This seemingly absurd statement carries a hidden but significant meaning—If I think that something bad is going to happen, I should do what I can to prevent it or at least mitigate the unwanted impact. The aviation industry worldwide has ascribed to this philosophy for the past several decades. They don't wait for something to break and then fix it, they apply **preventive** maintenance. Periodically, they will inspect a perfectly flyable aircraft for potential problems such as frayed wiring and corrosion. Based upon a predictable service life, they will reseal hydraulic actuators, replace the bushings in generators, change engines etc. The priority for performing preventive maintenance is based upon a risk analysis. What is the frequency of failure s in the past? Are there redundancies to compensate for the failure? If this element fails, what is the danger? This approach is not unique to the aviation world. At least it shouldn't be!

There are two kinds of high-powered commissions at the Federal level. One kind, investigates things after the fact to recommend corrective actions. An example is the Rogers Commission who investigated the Challenger accident. The other kind of commission is one that looks ahead to prevent something unwanted from happening—preventive maintenance. The Commission on the Future of the U.S. Aerospace Industry which is currently in session is an example of this kind of commission. An example from the recent past is U.S. Commission on National Security/21st Century (commonly called the Hart-Rudman Report) which was published in February 2001.

The Hart-Rudman Commission was comprised of distinguished members representing a broad array of the national interests. The resulting report was widely held to be credible at the time and has emerged with greater significance after September 11th. Their first recommendation was concerned with "Homeland Defense". This was not a recommendation that had been highlighted in the past and its timeliness borders on the eerie!

Their second recommendation was prefaced with this sentence: "Second only to a weapon of mass destruction detonating in an American city, we can think of nothing more dangerous than a failure to manage properly science, technology and education for the common good over the next quarter century". The Commission recommended 6 very specific actions for consideration by the Administration and the Congress.

The report recognizes the importance of drawing more minorities and women into these technical fields. It also highlights the uncertainties of counting on foreign workers to make up the gap. Finally, it strikes hard at the unsatisfactory state of science and mathematics teachers in our K-12 system. To summarize the seriousness of our national plight the report states: "In short, our problems are becoming cumulative. The nation is on the verge of a downward spiral in which current shortages will beget even more acute future shortages of high-quality professionals and competent teachers. The word "crisis" is much overused, but it is entirely appropriate here. If the United States does not stop and reverse negative education trends—the general teacher shortage, and the downward spiral in science and math education and performance—it will be unable to maintain its position of global leadership over the next quarter century".

The concern of the Commission and all of us is National Security. National Security comes in several components—physical security and economic security being foremost. Although we have progressed into a global economy led in many instances b U.S. multinational corporations, there are many times when we have to hold the sovereignty and survivability of our nation as the first priority. This happened in the aftermath of September 11th. The President's Science Advisor convened all applicable Federal Agencies to the White House to find out what technologies could be quickly

brought to bear in the “War on Terrorism”. Several hundred idea were put forward at that time and more have been submitted since then.

Many of those technologies found almost instant application. NASA’s Earth Science observations took on a new meaning. *Add several more here.*.

This rapid response would not have been possible had it not been the nation’s commitment of the past decades to research and the development of intellectual capital—two commodities with long lead times. Although those efforts were for other purposes, the fact that they were present when they were critically needed for other purposes is a lesson we should not forget.